

### **REMARKS**

The Office Action dated September 15, 2006, has been received and carefully noted. The above amendments and the following remarks are submitted as a full and complete response thereto.

By this Amendment, claims 1 and 2 have been amended. No new matter is presented. Support for the amendments to claims 1 and 2 can be found in at least paragraph [0007] of the specification as originally filed. Claims 1 and 2 are pending and respectfully submitted for consideration.

#### **Entry of Amendment**

Entry of this Amendment is proper under 37 C.F.R. §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issues requiring further search and/or consideration on the part of the Examiner as the Amendment merely clarifies the claimed features of the invention; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The Amendment is necessary and was not earlier presented because it is made in response to objections raised in the Final Rejection. Entry of the Amendment is thus respectfully requested.

#### **Rejection Under 35 U.S.C. § 103**

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiba et al. (Suzuki Segregation and Dislocation Locking in Supersaturated Co-Ni Based Alloy, hereinafter "Suzuki Segregation") in view of Chiba et al. (WO 02/24967 A1,

hereinafter "Chiba"). The Applicants note that the Office Action cited Chiba et al. (US 2004/0025989) as the English language version of Chiba et al. (WO 02/24967 A1). The Applicants also note that one of the inventors of the present application, Akihiko Chiba, is the same inventor of the Chiba reference and author of the Suzuki Segregation reference.

The Office Action asserted the position that Suzuki Segregation discloses many of the claimed elements of the invention with the exception of an alloy having a fine twin structure, a parent phase and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  precipitated at boundaries of the fine twin structure and the parent phase. The Office Action also acknowledged that Suzuki Segregation does not disclose an alloy that has at least one kind of 0.007 to 0.10% of REM; 0.001 to 0.010% of B; 0.0007 to 0.010% of Mg and 0.001 to 0.20% of Zr. Chiba was cited for curing this deficiency. The Applicants traverse the rejection and respectfully submit that claims 1 and 2 recite subject matter that is neither disclosed nor suggested by the cited references.

Claims 1 and 2, as amended, recite a fine twin structure having an average grain size of several microns; a parent phase; and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  having sizes from several microns to several tens of nanometers and precipitated at the boundaries of the fine twin structure and the parent phase.

The Office Action asserted the position that Suzuki Segregation in Fig. 2(b) teaches annealing the alloy at 1323 K (1050°C) to attain chemical homogeneity then aging the alloy at 943 K (670°C) in a condition of applied stress for about 1.1 hours. The Office Action asserted the position that this treatment would inherently produce the claimed results of a fine twin structure. The Office Action cited paragraph [0008] of the

Specification of the instant application as evidence of inherency. See page 3, lines 12-21 of the Office Action dated November 7, 2005.

As a preliminary matter, the Applicants respectfully submit that the Office Action's citation of paragraph [0008] of the Specification of the present application as evidence of inherency is impermissible hindsight. Under U.S. patent practice, the teaching or suggestion to make a claimed combination or motivation and the reasonable expectation of success must both be found in the prior art, not the applicant's disclosure. See In re Vaeck, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991). "Impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art" (emphasis added). See MPEP § 2142. The Applicants respectfully submit that paragraph [0008] of the Specification of the present application is not prior art. Therefore, paragraph [0008] does not provide evidence of inherency and cannot be cited by the Office Action to support the rejection. Accordingly, the Applicants respectfully request withdrawal of the rejection for at least this reason.

The Applicants further submit that the combination of Suzuki Segregation and Chiba does not disclose or suggest a fine twin structure having an average grain size of several microns and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  having sizes from several microns to several tens of nanometers. In order to form the fine twin structure and precipitate  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  at boundaries of the fine twin structure and the parent phase, the heat-resistant alloy is first subjected to a solid solution heat treatment by heating at 1000° to 1200°C and secondly to an aging heat treatment by heating for 0.5 to 16 hours at a temperature of 600° to 800°C in a condition of applying stress of 100 MPa or more. In contrast,

Suzuki Segregation shows in Fig. 2(b) that the maximum heat treatment temperature is 1073 K (578°C), which is lower than the above-required temperature to obtain the claimed fine twin structure. As such, the heat treatment of Suzuki Segregation is not comparable to the heat treatment disclosed in the present application for forming the fine twin structure and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$ .

Therefore, in Suzuki Segregation, it is impossible to form the fine twin structure having an average grain size of several microns and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  having sizes from several microns to several tens of nanometers precipitated at boundaries of the fine twin structure and the parent phase, as recited in claims 1 and 2.

The Applicants further submit that paragraph [0037] and Table 3 of the Specification of the present application show the disadvantages of an aging heat treatment in which the temperature is lower than that required for the claimed aging heat treatment. See, for example, comparative example 6 in Table 3 of the present application. As such, Suzuki Segregation does not teach or suggest at least the combination of features of a fine twin structure having an average grain size of several microns; a parent phase; and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  having sizes from several microns to several tens of nanometers and precipitated at boundaries of the fine twin structure and the parent phase, as recited in claims 1 and 2.

Chiba fails to cure the deficiencies in Suzuki Segregation as Chiba also fails to disclose or suggest a precipitation hardened Co-Ni based heat-resistant alloy comprising a fine twin structure having an average grain size of several microns; a parent phase; and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  having sizes from several microns to several tens

of nanometers and precipitated at boundaries of the fine twin structure and the parent phase, for the following reasons.

In order to form a fine twin structure recited in claims 1 and 2, a material is subjected to solid solution heat treatment, cold or warm working with a reduction rate of 40% or more, and high temperature aging heat treatment at 800 to 950°C for 0.5 to 16 hours. Alternatively, in the present invention, a heat-resistant alloy is heated to a temperature of 600° to 800°C in a condition of applying stress after the solid solution heat treatment. In contrast, Chiba discloses an aging heat treatment performed at 500 to 800°C for 0.1 to 50 hours with no stress after cold working. See paragraph [0041] of the English language version of Chiba. In such a heat treatment, only deposits are obtained. Thus, Chiba cannot be expected to obtain high strength in a high temperature since the deposits are coarse. As such Chiba cannot produce a fine twin structure and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  precipitated at boundaries of the fine twin structure and the parent phase, as recited in claims 1 and 2.

Therefore, Chiba does not cure the deficiencies in Suzuki Segregation with respect to the feature of the formation of a fine twin structure having an average grain size of several microns, a parent phase, and  $\text{Co}_3\text{Mo}$  or  $\text{Co}_7\text{Mo}_6$  having sizes from several microns to several tens of nanometers precipitated at boundaries of the fine twin structure and the parent phase, as recited in claims 1 and 2. As such, the combination of Suzuki Segregation and Chiba fails to disclose or suggest each and every feature of the invention as recited in claims 1 and 2.

In view of the above, the Applicants respectfully submit that the cited references fail to support a *prima facie* case of obviousness for purposes of a rejection of claims 1 and 2 under 35 U.S.C. § 103.

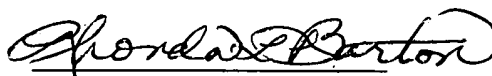
### **Conclusion**

The Applicants respectfully submit that claims 1 and 2 are allowable. Accordingly, the Applicants respectfully request withdrawal of the rejections, allowance of claims 1 and 2, and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing Attorney Dkt. No. 108421-00075.**

Respectfully submitted,



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RLB/elz/wbp

Enclosure: Petition for Extension of Time (one month)